

Supporting Healthy Houses of Worship EJ Webinar Series

Improving Indoor Air **Breathe Healthier Indoor Air in Houses of Worship & Other Facilities**

September 20, 2022

Helping faith leaders and faith-based organizations address environmental and public health issues in and around their facilities, facing their congregations, and in the communities within which they serve.

* Please note that this webinar will be recorded and posted.

Panelists

Cristina Schulingkamp, Environmental Engineer, Partnership and Grants Division, Air and Radiation Division, U.S. EPA Region 3

Laura Boyette, Life Scientist, Partnership and Grants Branch, Air and Radiation Division, U.S. EPA Region 3

Reverend Zach Hopple, Pastor, Christ United Methodist Church, Lansdale, PA
(Welcome & Introductions)

Danny Gogal and Ericka Farrell, Office of Environmental Justice and External Civil Rights, U.S. EPA (Facilitators)



Supporting Healthy Houses of Worship

Improving Indoor Air Quality and Energy Savings

September 20, 2022

Laura Boyette
Cristina Schulingkamp

Webinar Goals



- Healthy Environments for Worship, Learning and Service
 - stewardship of time, talent, gifts
- Effective, Affordable measures to protect the health of congregations and staff
- Discuss
 - Common indoor pollutants
 - Recommendations to reduce exposure
 - Resources and information

Indoor Environments

Indoor Air Quality (IAQ)

Defined

Why its important

What causes poor IAQ

How IAQ affects us

How to reduce exposures

Whose job is it?



Indoor Environments

What is:

Indoor Air Quality (IAQ)
refers to what we breathe

Indoor Environmental Quality (IEQ)
refers to what we breathe, see, hear, feel indoors

Importance

- Spend upwards of 90% of time indoors
- Pollutants can concentrate indoors

Sources

- Can begin outdoors and/or indoors



Pollutant Sources

- **Occupants**
- **Combustion Gases**
- **Chemicals**
- **Biologicals**
- **Building Materials**
- **Naturally Occuring**

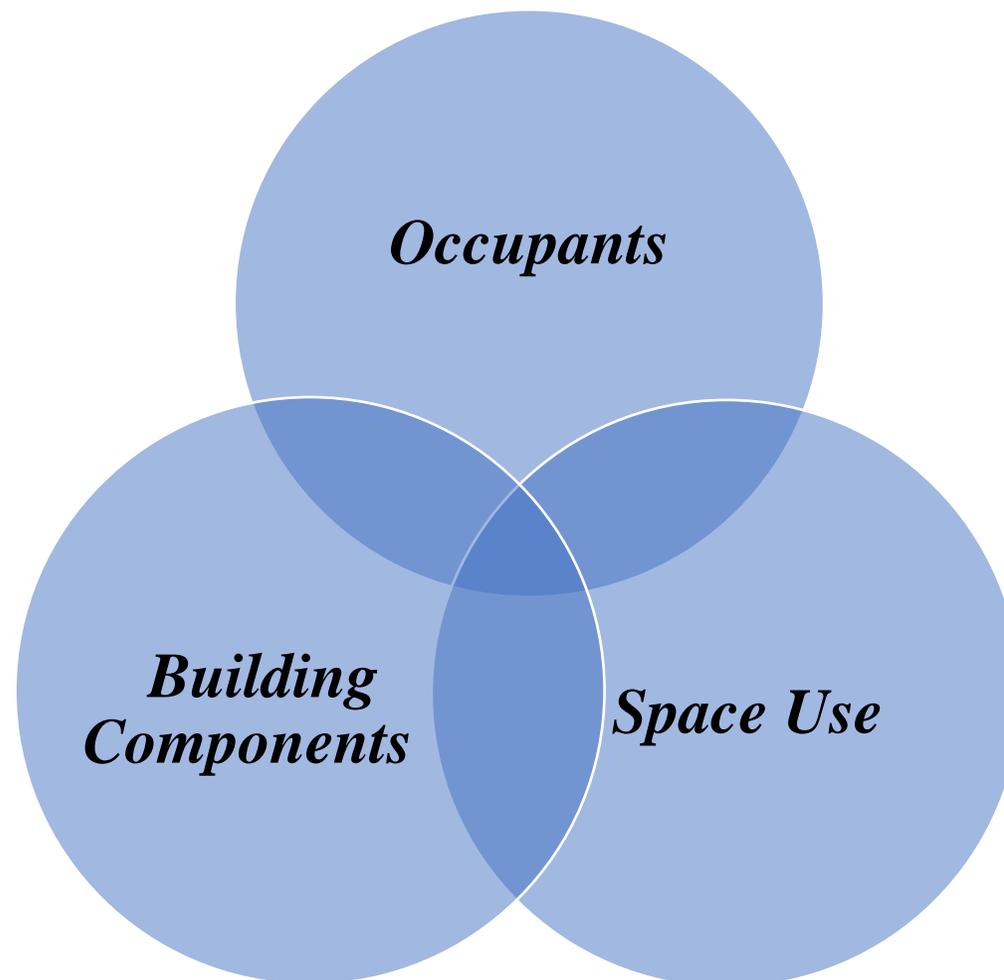
Remember...

What's outside gets inside.



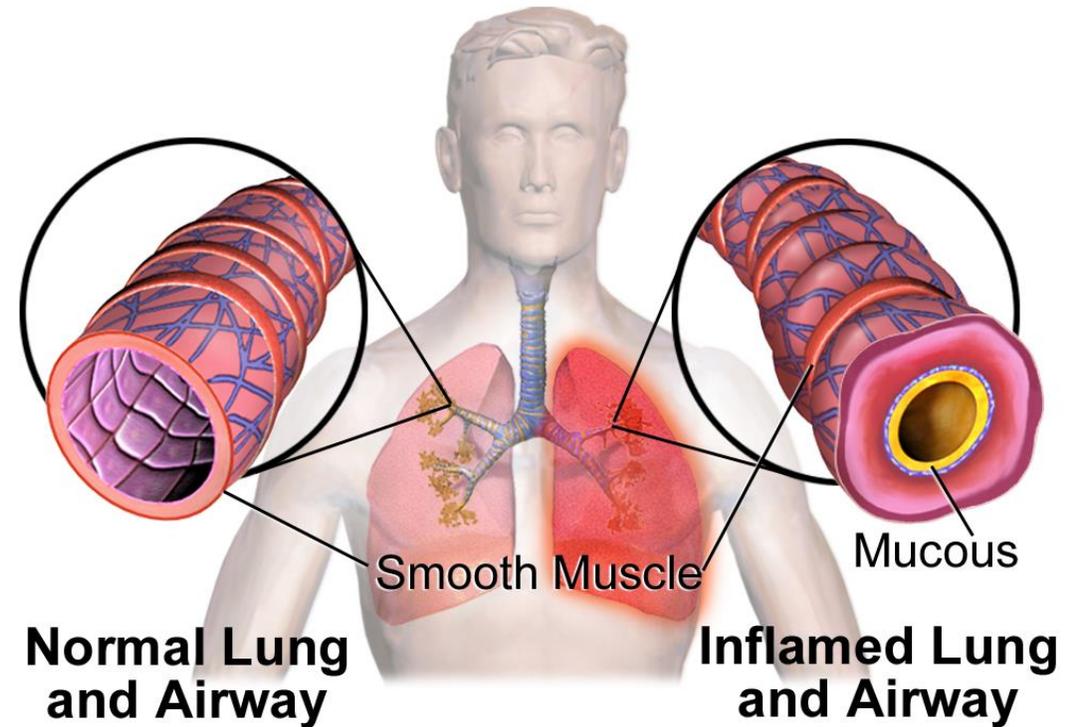
Pollutant Sources

- How pollutants affects us
 - How to reduce exposures
 - Whose job is it?
-
- **What we know**
 - 1. No occupants = no issues
 - 2. What's indoors concentrates
 - 3. What's outdoors gets indoors



One Effect - Asthma

- >25 million Americans (1 of 10 school children)
- Under 11 years of age have more uncontrolled asthma attacks
- **Triggers:**
 - Animal /pest allergens
 - Mold/moisture
 - Dust mites, smoke, chemical odors
 - Outdoor air pollution



Other Effects

Chronic – Long term

Acute – Short term

Flu-like Symptoms

Watery eyes, sinus congestion

Shortness of breath, headache

Respiratory nose/throat irritation

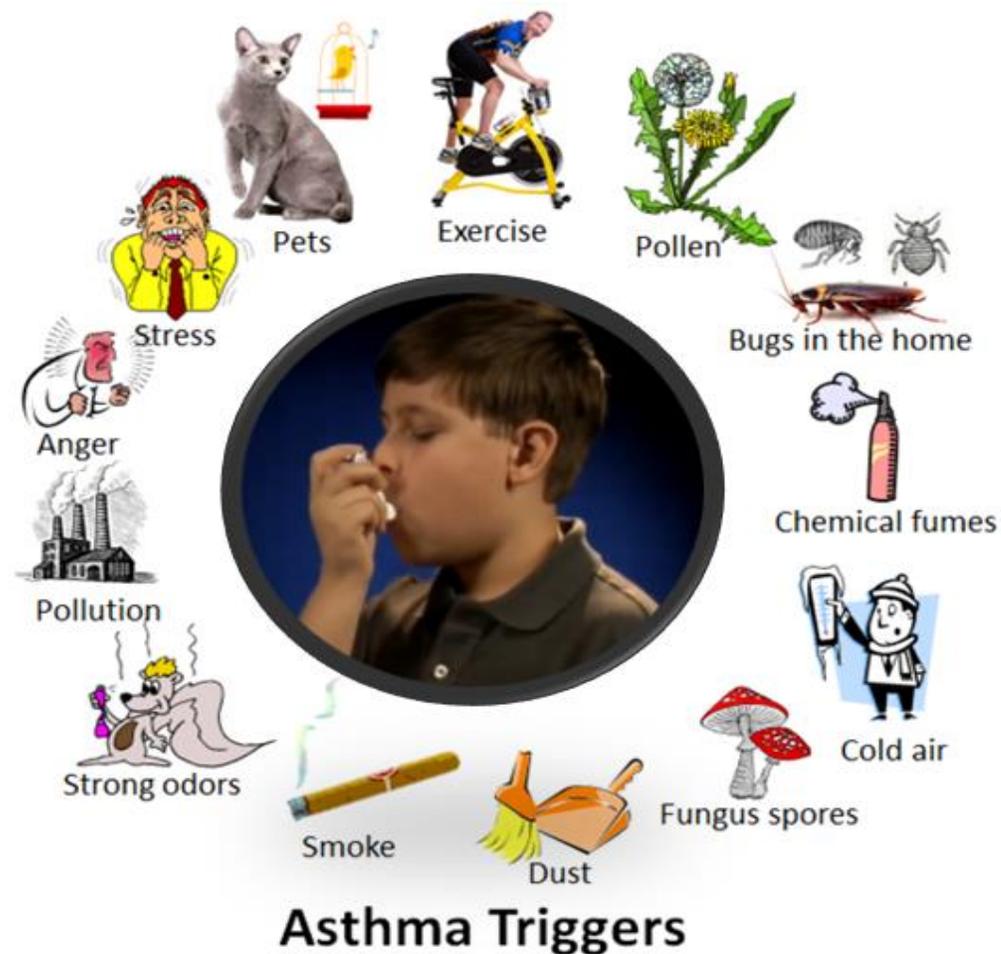
Fatigue, dizziness

Nausea, allergic sensitivity



Reducing Asthma Triggers

- Smoke free environment
- Fragrance free cleaning products
- Adequate ventilation/filtration fresh outside air
- Enhanced housekeeping
- Integrated Pest Management (IPM) program



Vehicle Idling

Diesel vehicles/buses

- Produce hazardous toxins
- Contribute to air pollution
- Exhaust contains significant levels of particulate matter

Reduce Idling:

- Pickup/drop off locations
- Near outdoor air intakes /windows/doors

Benefits — reduced fuel use, costs and unnecessary engine wear



Carbon Monoxide (CO)

‘Silent Killer’

- Colorless, odorless gas from combustion
- **Sources:**
 - **Indoors** - improperly vented furnaces, malfunctioning gas ranges, exhaust fumes, boilers, blocked flue, disconnected or leaking
 - **Outdoors** - Auto, truck or bus exhaust from attached garages, idling, and nearby roads

Different Types of CO Alarms



Carbon Monoxide (CO)

- **Exposure**
 - Flu-like symptoms (dizziness, fatigue, headaches, nausea, disorientation)
 - High levels = loss of consciousness and death
- **Combustion Equipment**
 - Maintain/annual inspection
 - CO alarms
 - Reduce/eliminate vehicle idling



Asbestos

Natural mineral fiber

Carcinogen (mesothelioma)

Products:

Attic/wall insulation containing vermiculite

Vinyl floor tiles/backing + adhesives

Roofing/siding singles

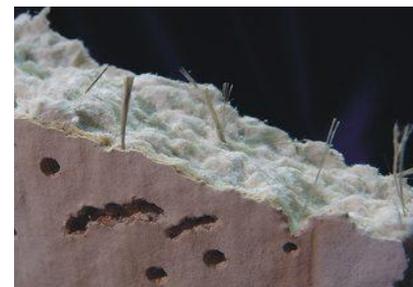
Textured paint/patching compounds

Walls/floors around wood burning stoves

Oil/coal furnaces/door gaskets with asbestos insulation

Heat resistant fabrics

Automobile clutches/brakes



Health Affects:

Asbestosis

Lung Cancer

Mesothelioma

Lead

- **Highly toxic metal**
- **Most common source**
 - Paint indoors (before 1978)
 - Dust from renovations, deteriorating lead paint, dust outdoors
 - Playground equipment/toys
- **Results in lower IQ scores**
 - Developmental disabilities
 - Learning disabilities



- **Reduce Exposure**
 - Check
 - Interior painted surfaces
 - Exterior painted surfaces
 - Outdoor play structures
 - Wash hands after playing outside

Lead

- **Toxic metal in water**
 - Lead pipes – service lines/drinking water coolers
 - Other Contaminants of Concern

Reduce Exposure:

- Regularly clean faucet/fountain aerators
- Regularly flush all water outlets
- Talk to your local water provider and health department about testing
- No safe level of lead in water
 - 15 pbb (0.015 mg/L)



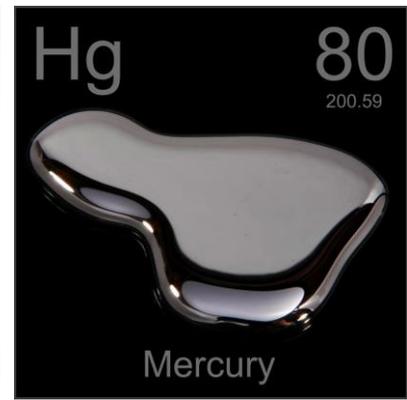
- Those operating their own water systems are required to comply with the Safe Water Drinking Act (SDWA).
- Childcare/schools toolkit - EPA's 3T's for Reducing Lead in Drinking Water

Mercury

- **Neurotoxin**
- **Health Effects**
 - High levels - brain, kidneys, heart, lungs immune system
 - Children/unborn - harms developing nervous system
 - Additional effects
- **Common Exposures**
 - Eating fish/shellfish
 - Breathing mercury vapor

• Products

- Thermometers,
- Novelty jewelry
- Barometers
- Automotive switches
- Thermostats
- Amalgam in dental fillings
- Some batteries,
- Fluorescent light bulbs /CFLs



Mercury

- **Prevent Exposure**

- Inventory
- Proper disposal
- Replace with alternatives

- **Spill**

- Evacuate staff
- Contact health Dept/Environmental Agency (emergency response)
- Never use vacuums, brooms
- Direct contact items – discard per local Health or fire department



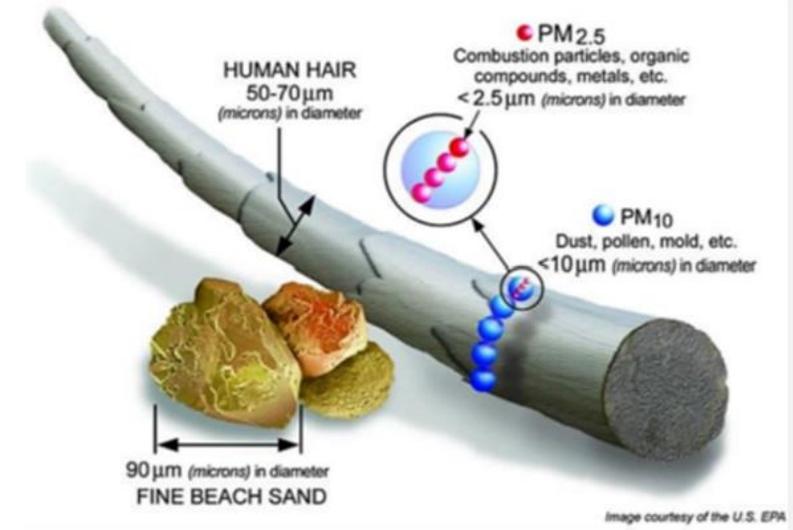
Ozone

- **Health Risks:**

- Decrease lung function/inflammation
- Aggravates asthma
- Throat irritation/cough
- Chest pain/shortness of breath
- Increased susceptibility to respiratory infections

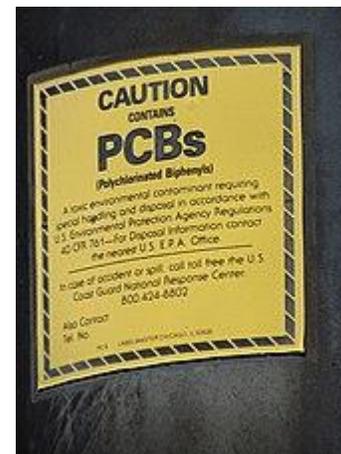
- **Factors:**

- Increase of ozone outdoors
- Increased exposure
- Activities that raise breathing rate/pre-existing respiratory concerns



Polychlorinated Biphenyls (PCBs)

- Organic chemicals in commercial products (1950-1970s) Banned in 1979
- Caulking, electronics, fluorescent light ballasts, capacitors
- Removal recommended during renovations/repairs
- HVAC maintained/inspected /operating properly
- Housekeeping to reduce dust
- Vacuum with high efficiency particulate air filters (HEPA)
- Avoid dry sweeping or dusting
- Wash children's toys
- Wash hands before eating



Chemical Management Plan

- Cleaning+
- Risks from spills, fires, accidental exposures.
- Hazardous chemicals include corrosive acids, bases, oxidizers, compressed gases, flammable solvents.
- Exposure can cause asthma attacks, irritation of eyes, skin, nose and throat, unconsciousness.



Chemical Management Plan

- **Mismanaged if:**

- Poor condition/expired
- Overabundant/Not needed/Used
- Not properly labeled
- Unsecured
- Inappropriately stored

- **Proper Chemical Management**

- Annual inventory
- Prohibit unauthorized use
- Store appropriately
- Label all containers
- Safety Data Sheet
- Regular cleanouts
- Train staff on use
- EPA approved Safer Choice products



Educational, Art & Craft Supplies



- **Common art supplies**

- Glues, cleaners, glazes, paints, solvents, clays

- **Hazardous ingredients**

- Lead, VOCs, dust, fibers
- Use by appropriate age group
- Can be ingested, inhaled or skin absorbed

- The U.S. Consumer Product Safety Commission – Conforms to the American Society for Testing and Materials (ASTM) D4236 with no cautionary label warnings

- **Reduce Hazardous:**

- Careful purchase/selection
- Check label (toxic or nontoxic)
- Read, follow instructions for use/ventilation requirements
- Safety Data Sheets
- No eating/drinking
- Lockup/Store and dispose according to label
- Wash hands
- Supervision



Pesticides & Pest Management



- **Use pesticides judiciously**

- **Definition**

- Substance or mixture intended to prevent, destroy, repel pests
- Types: fungicides (fungi), herbicides (plants), insecticides (animals)

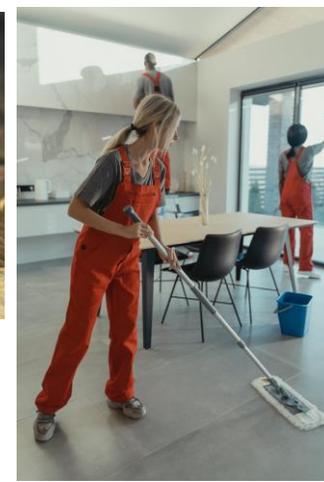
- **Adverse Effects**

- Highly toxic
- Dizziness, nausea → neurological disorders
- Neurotoxins, skin/eye irritants, linked to cancer, Alzheimer's disease, birth defects

- **Sensitivity**

- Children, elderly, pre-existing conditions

Manage Pests



• **Exclusion Practices**

- Install door sweeps
- Seal openings around utility pipes
- Install window screens
- Caulk/seal windows, doors and other openings
- Reduce landscaping close to building
- Keep dumpsters/trash away from building

• **Housekeeping**

- Clean all food service areas daily
- Use sealed plastic containers for food storage /toss expired
- Bag garbage and secure outside in dumpsters
- Reduce clutter in all areas
- Dust, mop, use HEPA vacuum regularly
- Maintain conditioned spaces to reduce excess humidity
- Minimize eating areas

Indoor Air Quality/Ventilation



- **Indoor Air Quality:**

- Affects comfort, well being and productivity
- Perceived as a comfort issue

- **Poor Indoor Air Quality:**

- Inadequate
 - Heating, ventilation, air conditioning
 - Amount of outside air
 - Cleanliness/general housekeeping
 - Proper maintenance

- **Health Concerns:**

- Fatigue, nausea, coughing, eye irritation, headaches, asthma episodes, allergic reactions
- Rare cases – life threatening conditions



- **Ventilation** is key to good indoor air quality

Building Envelope

- Regularly assess and maintain
- Prevent uncontrolled moisture from entering
 - Windows, doors
 - Roof top, gutters, downspouts, soffits
 - Grading, mulch
 - Plants
 - Building envelope (stucco, brick, siding, flashing, stone)
 - Chimney, exhaust vents, roof top-HVAC, other penetrations



Mold & Moisture Control

- Mold spores are everywhere
- Produce allergens/toxins
- Molds affect everyone

- **Health Effects:** irritation of eyes, skin, nose, throat, lungs, respiratory concerns (asthma)

- **Prevention**
 - Regular building maintenance /assess
 - Sources: roof leaks, landscaping/gutters, building envelope, unvented combustion appliances, windows/doors, pipes, bathrooms
 - Identify the source of moisture, fix, clean and dry/toss wet materials



Mold & Moisture Control

- *Remember....the Key to Mold Control is Moisture Control*
- **Control Moisture**
 - *Maintain humidity 30-50%*
 - *Clean/dry wet areas withing 48 hrs*
 - *Check regularly/fix leaks asap*



Who's Responsible?

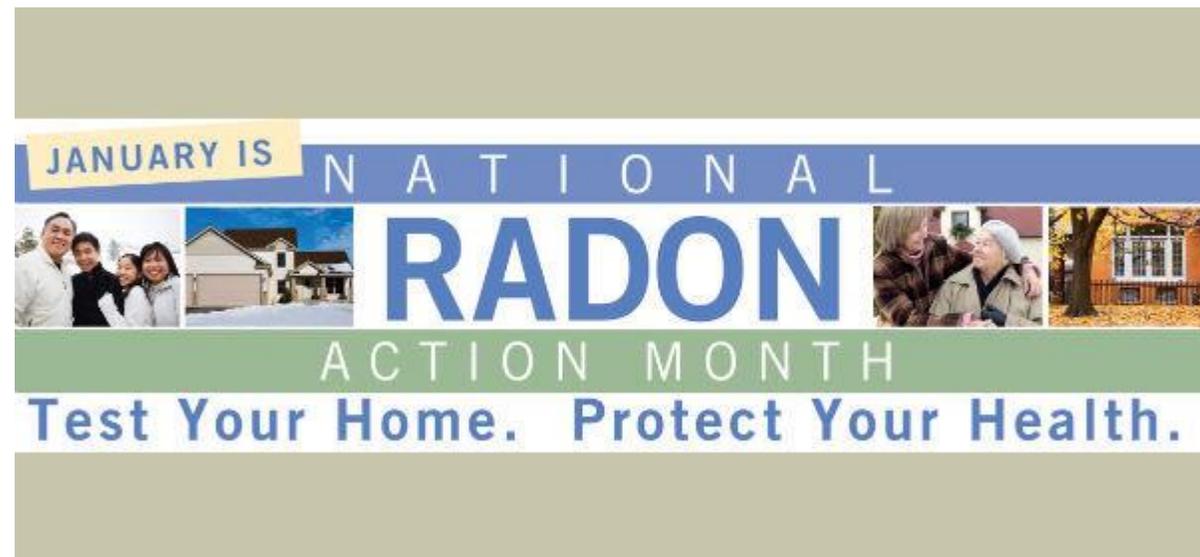
- **Team effort**
 - Property owners/managers
 - Facilities
 - Administrators
 - Finance
 - Staff
 - Congregation



*Everyone can participate in good stewardship
lending their time, talents and gifts.*

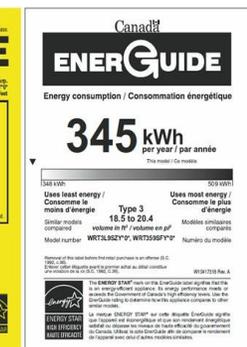
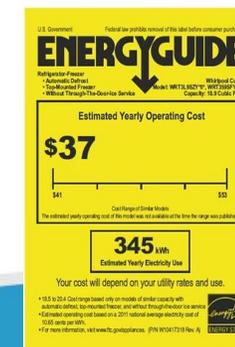
Radon

- Radioactive, colorless, odorless naturally occurring gas
- 21,000 American lung cancer deaths/year
- All building types
- Easy to test and mitigate
- 4 picoCuries/liter (4pCi/l)
- Contact your State Radon Program



Energy Star Program

- Energy Efficiency = saving money
- Savings → building improvements/upgrades
- Ways to Save :
 - Upgrade your lighting
 - Operations/Maintenance best practices
 - Checklists of Energy saving measures
 - Energy Efficient products
 - Building upgrades
 - Information on water, waste, renewable energy



ENERGY Star for Congregations

The Challenge: To lower costs in the OLG congregation while improving sustainability.

The Solution: By tracking energy and water through EPA's ENERGY STAR® Portfolio Manager®, OLG pinpointed areas to focus on for increased efficiency.



The Sanctuary at Our Lady of Guadalupe

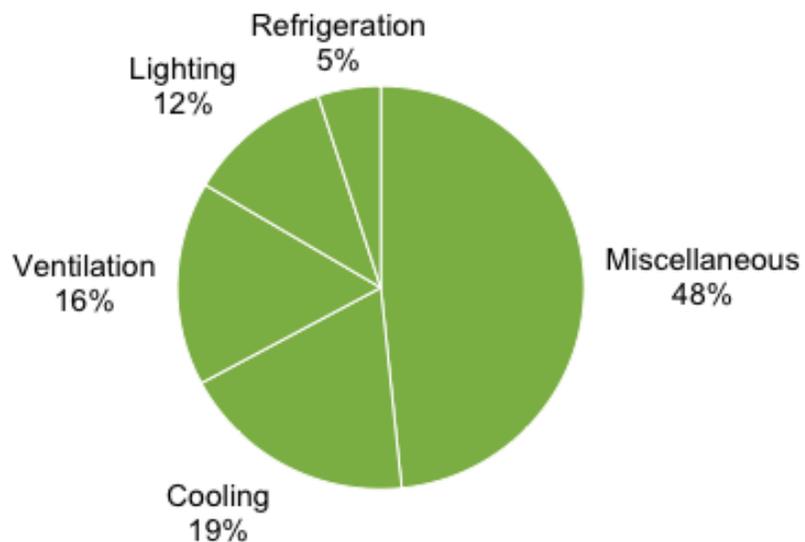
"Our K-8 school has saved thousands of dollars in energy costs which can now be budgeted towards instructional resources. We are so grateful to be not only helping the environment but to also be helping our teachers and students at the same time." - Donna Ramos, Principal, Our Lady of Guadalupe School.

- Our Lady of Guadalupe Parish (OLG), founded in 1962, consists of 4 buildings and over 66,000 sq.ft. of space:
 - Replaced a 49-year old boiler used for heating their school with a new, condensing boiler resulting in gas heating **savings of 48%**.
 - Implemented sustainability practices around waste, and increased recycling efforts.
 - Started benchmarking through Portfolio Manager.
 - Introduced green building materials such as interior panels made from 100% post-consumer recycled paper bound together with resin.
 - Implemented two rainwater gardens to collect water from the roof and channel excess into underground storm surge tanks.
 - Updated interior and exterior lighting, including replacing 136 incandescent bulbs with LED bulbs, resulting in a 60% reduction in energy use (**savings of \$1000/month in winter months**).

Energy Use for Houses of Worship

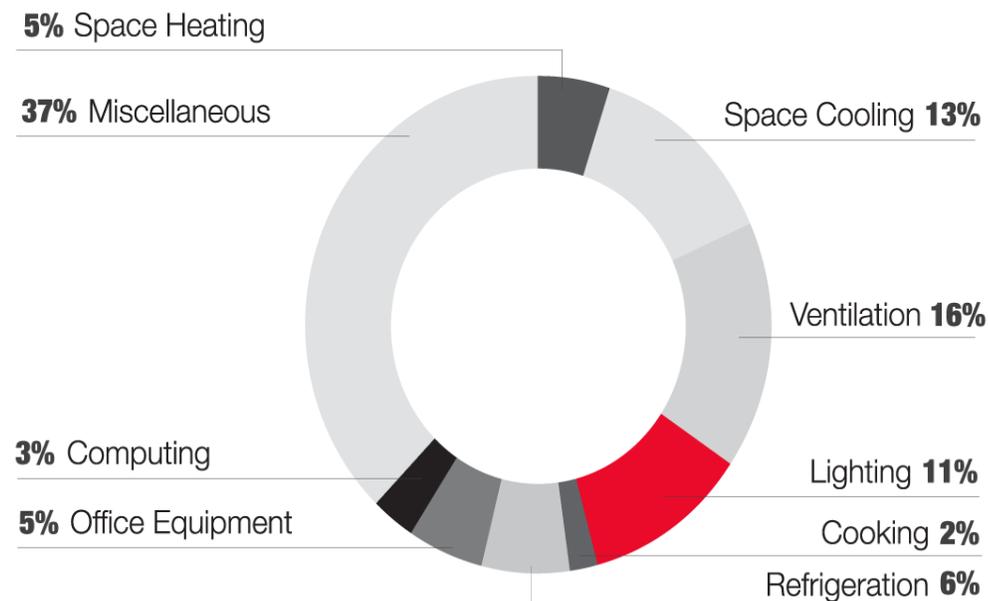


Electricity end uses in congregational buildings



Notes: Heating, office, cooking, computer, and water heating end uses each represent less than 5 percent of total consumption and are included in "Miscellaneous" uses.

© E Source



Water Efficiency



- **EPA's WaterSense Program**

- Save water, energy, money
- Tools /resources
- Best practices

- **Low-Cost Measures**

- Portfolio Manager Tracking
- Assess water usage/unexpected waste
- Educate occupants about water use, how to report leaks/problems
- Minimize outside watering

- **Cost Effective Investments**

- Update plumbing fixtures/irrigation controls
- Optimize HVAC equipment
- Purchase energy star certified low flow water appliances
- Include water efficiency requirements in contracts/service agreements
- Contact water/energy providers for rebates/giveaways of efficient products/equipment

Waste Reduction



- **EPA's Waste Wise Program**

- Assess all the products you use
- Start a pre-post waste reduction program
- Engage youth/community
- Save money from waste disposal
- Reduce landfill waste

- **Reduce Waste**

- Recycle, reuse or compost recyclables
- Purchase environmentally friendly products/reduce single use products where possible



Resources & Information

Learn about IAQ



- [Learn about IAQ](#)
 - [Air Cleaners and Filters](#)
 - [Climate Change and IAQ](#)
 - [Emergencies and IAQ](#)
 - [Webinars, Meetings and Updates](#)

Protect IAQ in Buildings



- [IAQ by Building Type](#)
 - [Homes](#)
 - [Schools](#)
 - [Offices & Other Large Buildings](#)

Did You Know...

September is National Preparedness Month.

[Learn how emergencies can affect your indoor environment and actions you can take to protect your health.](#)

Related Topics

- [Asthma](#)
- [Mold](#)
- [Radon](#)
- [Indoor AirPLUS](#)

Indoor Air Quality Program

Radon Program

WaterSense

Take steps each day to save water and protect the environment by choosing [WaterSense labeled products](#) in your home, yard, and business. [Learn more](#) about WaterSense and how we can all get more by using less.



Look for the WaterSense Label!

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WaterSense for Kids

- [Let's Learn About WaterSense!](#)
- [Why Save Water?](#)
- [Simple Ways to Save Water](#)
- [Test Your WaterSense Game](#)
- [Resources for Educators](#)



Our Water

- [How We Use Water](#)
- [Understanding Your Water Bill](#)
- [Start Saving](#)
- [Save with Us](#)
- [Fix a Leak!](#)

WaterSense Program

Energy Star Program

Improving Indoor Air

Breathe Healthier Indoor Air in Houses of Worship

Questions and Answers Period

Evaluation:

<https://docs.google.com/forms/d/e/1FAIpQLScfRP3w-Mm9mj68H5oNnpe5VbHsUsKhVsM7SjNz26J8qiztKA/viewform>

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